

REMARKS

Claim 8, as proposed to be amended, recites diluting the solvent of the matrix solution. Support for this amendment is found in the as-filed specification at at least paragraphs [0064], [0067], and [0071]. Claims 12 and 16 have been amended to improve antecedent basis. The amendments should be entered by the Examiner because they put the application in condition for allowance.

The Final Office Action mailed May 19, 2006, has been received and reviewed. Claims 1-25 are currently pending in the application, of which claims 1-17 are currently under examination. Claims 18-25 have been withdrawn from consideration as being drawn to a nonelected invention and are canceled herein without prejudice or disclaimer to the filing of one or more divisional applications including same. Claims 1-17 stand rejected. Applicants have amended claims 8, 12, and 16, and respectfully request reconsideration of the application as amended herein.

35 U.S.C. § 103(a) Obviousness Rejection**Obviousness Rejection Based on U.S. Patent No. 6,034,149 to Bleys *et al.***

Claims 1-17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,034,149 to Bleys *et al.* ("Bleys"). Applicants respectfully traverse this rejection, as hereinafter set forth.

M.P.E.P. 706.02(j) sets forth the standard for an obviousness rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The obviousness rejection of claims 1-17 is improper because the cited reference does not teach or suggest all of the limitations of the claims and does not provide a motivation to combine to produce the claimed invention.

Bleys teaches a hydrophilic polyurethane foam formed from the reaction product of a polyisocyanate with a polyetherpolyol. Bleys at column 1, lines 57-67. The polyetherpolyol can be a polymer of acrylonitrile and styrene. *Id.* at column 3, lines 47-55. When reacted, the polyisocyanate and the polyetherpolyol form a prepolymer, which is reacted with water to produce the polyurethane foam. *Id.* at column 1, lines 57-67 and column 4, lines 6-9. A superabsorbent polymer (“SAP”) is impregnated or incorporated in the polyurethane foam. *Id.* at column 4, lines 60-64. The SAP is prepared by polymerizing a diallyl dialkyl quaternary ammonium salt with a polyfunctional divinyl compound and/or a crosslinker. *Id.* at column 5, lines 52-55. The crosslinker is triallyl methylammonium chloride. *Id.*

Bleys does not teach or suggest the limitation of “at least one trialkyl methylammonium compound homogenously dispersed in a polyacrylonitrile matrix,” as recited in claim 1, because Bleys does not teach or suggest a polyacrylonitrile matrix. As known in the art, polyacrylonitrile is a polymer of acrylonitrile. In other words, polyacrylonitrile is formed by the polymerization of acrylonitrile monomers. The Examiner states that column 3, lines 47-51 of Bleys teaches polyacrylonitrile. However, in actuality, the cited section of Bleys teaches a polyether polyol formed from acrylonitrile and styrene monomers. The resulting polyether polyol would be a styrene-acrylonitrile polymer or styrene-acrylonitrile copolymer, not polyacrylonitrile. Thus, it is incorrect for the Examiner to rely on the cited section of Bleys as teaching polyacrylonitrile. This polyether polyol, which would be a styrene-acrylonitrile polymer or styrene-acrylonitrile copolymer, is then reacted with a polyisocyanate to form a prepolymer. The resulting prepolymer also can not be characterized as polyacrylonitrile because it would be a polymer of styrene, acrylonitrile, and the polyisocyanate.

Bleys also does not teach or suggest at least one trialkyl methylammonium compound homogenously dispersed in the polyacrylonitrile matrix because Bleys does not teach or suggest at least one trialkyl methylammonium compound. While Bleys teaches using triallyl methylammonium chloride as a crosslinker to form the SAP, triallyl methylammonium chloride is not a trialkyl methylammonium compound. As is known by a person of ordinary skill in the art, an allyl group includes carbon-carbon double bonds while an alkyl group includes carbon-carbon single bonds. This difference between allyl and alkyl groups is acknowledged by the Examiner. Office Action of May 19, 2006, p. 7. As such, the allyl group of the triallyl methylammonium chloride includes carbon-carbon double bonds while the alkyl group of the

trialkyl methylammonium compound includes carbon-carbon single bonds. Since alkyl and allyl groups are different chemical groups, Bleys does not teach the trialkyl methylammonium compound as recited in claim 1.

The triallyl methylammonium chloride of Bleys also does not suggest the trialkyl methylammonium compound recited in claim 1. The Examiner states that “[t]he disclosure of ‘triallyl’ [in Bleys] is deemed to encompass or at least suggest the claimed ‘trialkyl.’” Office Action of May 19, 2006, p. 3. However, the Examiner has not provided any objective reasons in support of this assertion. Rather, the reasons provided by the Examiner are conclusory. The Examiner states that trialkyl methylammonium chloride is suggested by triallyl methylammonium chloride because “Applicant appears to admit that both compounds contain the same elements, including ‘carbon-carbon’ single bonds, which would obviously, to one of ordinary skill in the art suggest either trialkyl or triallyl.” *Id.* at p. 6. While Applicants acknowledge that trialkyl methylammonium chloride and triallyl methylammonium chloride include similar elements, Applicants have not admitted, and do not admit, that this similarity provides the suggestion to produce the claimed invention. Furthermore, the Examiner’s reasoning is conclusory because the mere fact that trialkyl methylammonium chloride and triallyl methylammonium chloride include the same elements does not suggest a reason for replacing the latter by the former in the teachings of Bleys.

The Examiner also states that “Applicant appears to admit that triallyl methylammonium chloride is disclosed, which would at least suggest trialkyl methylammonium compound to one of ordinary skill in the art at the time the invention was made.” *Id.* at p. 5-6. Applicants acknowledge that Bleys discloses using triallyl methylammonium chloride as a crosslinker. However, Applicants do not agree, and have not admitted, that the disclosure of triallyl methylammonium chloride suggests a trialkyl methylammonium compound. Again, the Examiner has not provided any reasons in support of this statement. Applicants respectfully submit that the use of triallyl methylammonium chloride as a crosslinker would not suggest to a person of ordinary skill in the art to use a trialkyl methylammonium compound because alkyl and allyl groups have different chemical reactivities.

The Examiner also states that the Applicants are arguing features that are not recited in the claims. *Id.* However, Applicants disagree with the Examiner’s characterization of Applicants’ arguments. Applicants’ discussion in the previously-filed response of carbon-carbon

single bonds in an alkyl group and carbon-carbon double bonds in an allyl group was an explanation of the differences between alkyl groups and allyl groups. A person of ordinary skill in the art would understand that alkyl groups and allyl groups are inherently different, chemical groups. As known in the art, an alkyl group is a radical that forms when an aliphatic hydrocarbon loses one hydrogen atom. The alkyl group is a hydrocarbon derived from an alkane, which, as known in the art, includes carbon-carbon single bonds and is inherently a saturated group. As such, one of ordinary skill in the art would understand that a triallyl methylammonium chloride, as taught in Bleys, is not a trialkyl methylammonium compound as recited in claim 1.

In addition, since Bleys does not teach or suggest a polyacrylonitrile matrix or a trialkyl methylammonium compound, Bleys necessarily does not teach or suggest a trialkyl methylammonium compound homogenously dispersed in a polyacrylonitrile matrix, as recited in claim 1.

The cited references also do not provide a motivation to combine to produce the claimed invention. To provide a motivation or suggestion to combine, the prior art or the knowledge of a person of ordinary skill in the art must “suggest the desirability of the combination” or provide “an objective reason to combine the teachings of the references.” M.P.E.P. § 2143.01. “[I]f the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.” *Id.*

Nothing in Bleys suggest the desirability of, or provide an objective reason for, using a trialkyl methylammonium compound in place of the triallyl methylammonium chloride. Rather, the teachings of Bleys are limited to using triallyl methylammonium chloride as a crosslinker. Bleys does not suggest the desirability of, or provide an objective reason for, using other compounds, such as a trialkyl methylammonium compound, as a crosslinker in the production of its polyurethane foam.

Furthermore, Applicants respectfully submit that if Bleys were modified to include a trialkyl methylammonium compound, the polyurethane foam of Bleys would not be produced because the trialkyl methylammonium compound would not function as a crosslinker. As known in the art, a crosslinker must have a reactive, polymerizable group, such as a double bond, triple bond, allylic group, etc. See, U.S. Patent No. 5,906,734 to Girot *et al.* (“Girot”) at column 9, lines 51-60. Since a trialkyl methylammonium compound does not include such a reactive,

polymerizable group, the trialkyl methylammonium compound would not function as a crosslinker. Since the proposed modification would render the polyurethane foam of Bleys unsatisfactory for its intended purpose, there is no motivation to make the proposed modification.

Claims 2-7 are allowable, *inter alia*, as depending from claim 1.

Claim 2 is further allowable because Bleys does not teach or suggest that the trialkyl methylammonium compound is trialkyl methylammonium nitrate or trialkyl methylammonium chloride.

Claim 5 is further allowable because Bleys does not teach or suggest that the trialkyl methylammonium compound comprises homogeneous substantially spherical particles.

Claim 6 is further allowable because Bleys does not teach or suggest a substrate at least partially impregnated with the at least one trialkyl methylammonium compound homogeneously dispersed in the polyacrylonitrile matrix.

Claim 7 is further allowable because Bleys does not teach or suggest a substrate that comprises glass fiber, paper, or polytetrafluoroethylene.

Bleys also does not teach or suggest all of the limitations of independent claim 8. Specifically, Bleys does not teach or suggest the limitation of “dissolving polyacrylonitrile in a solvent to form a matrix solution” because the prepolymer taught in Example 1 is formed by the polymerization of a polyether having random oxyethylene and oxypropylene residues and 4,4'-methylene diphenylene diisocyanate. Since this prepolymer is not polyacrylonitrile, Bleys necessarily does not teach or suggest dissolving polyacrylonitrile in a solvent to form a matrix solution.

Bleys also does not teach or suggest the limitation of “combining at least one trialkyl methylammonium compound with the matrix solution to form a homogeneous, composite medium solution” because Bleys does not teach or suggest using a trialkyl methylammonium compound for the reasons discussed above.

Bleys also does not teach or suggest the limitations of “diluting the solvent of the matrix solution” and “solidifying the homogeneous, composite medium solution.” While Bleys teaches mixing a prepolymer with water, this would form a solution of the prepolymer in water. However, claim 8 recites diluting the solvent of the matrix solution. As such, this limitation implies further diluting an already-existing solution. However, nothing in Bleys teaches or suggests diluting the solution formed from the prepolymer and water.

Bleys also does not teach or suggest solidifying the homogenous, composite medium solution. Since Bleys does not teach or suggest combining at least one trialkyl methylammonium compound with the matrix solution to form the homogenous, composite medium solution, Bleys necessarily does not teach or suggest solidifying the homogenous, composite medium solution.

Claims 9-17 are allowable, *inter alia*, as depending from claim 8.

Claim 10 is further allowable because Bleys does not teach or suggest combining trialkyl methylammonium nitrate or trialkyl methylammonium chloride in the matrix solution.

Claim 12 is further allowable because Bleys does not teach or suggest depositing portions of the composite medium solution into a water bath.

Claim 13 is further allowable because Bleys does not teach or suggest forming homogenous, substantially spherical beads from the portions of the composite medium solution.

Claims 14 and 15 are further allowable because Bleys does not teach or suggest impregnating the homogenous, composite medium solution into a substrate, or that the substrate is glass fiber, paper, or polytetrafluoroethylene, respectively.

Claim 16 is further allowable because Bleys does not teach or suggest depositing the substrate into a water bath.

Claim 17 is further allowable because Bleys does not teach or suggest entrapping the at least one at least one trialkyl methylammonium compound in the polyacrylonitrile.

Obviousness Rejection Based on Bleys in view of Girot

Claims 1-17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Bleys in view of Girot. Applicants respectfully traverse this rejection, as hereinafter set forth.

Girot teaches a passivated porous support that includes a porous solid matrix and a polymer network. Girot at column 4, lines 47-59. The polymer network includes a main monomer, a passivation monomer, and a crosslinking agent. *Id.* The porous solid matrix is a hydrophobic polymer. *Id.* at column 5, lines 6-14.

The Examiner relies on Girot as teaching trimethyl ammonium chloride and states that “[i]t would have been obvious to one of ordinary skill in the art at the time the invention was made to use the ‘trimethyl’ of Girot as the ‘triallyl’ group of the methyl ammonium chloride of Bleys because Bleys discloses ‘triallyl’ ammonium chloride in a sorbent and Girot discloses the trimethyl ammonium chloride for use in preparation of exchange resins.” Office Action of May

19, 2006, p. 4. However, Examples 2 and 17 of Girot do not teach trimethyl ammonium chloride. Rather, these examples teach methacrylamidopropyl trimethyl ammonium chloride. Since trimethyl ammonium chloride and methacrylamidopropyl trimethyl ammonium chloride are different chemical compounds, it is improper for the Examiner to rely on Girot as teaching trimethyl ammonium chloride.

Since Girot does not cure the above-mentioned deficiencies in Bleys, the cited references do not teach or suggest all of the limitations of claims 1 and 8. Specifically, the cited references do not teach or suggest all of the claim limitations discussed above. In addition, since Girot does not teach or suggest trimethyl ammonium chloride, Bleys and Girot, when combined, do not suggest the desirability of, or provide an objective reason for, using trimethyl ammonium chloride in place of the triallyl ammonium chloride of Bleys. Furthermore, even if Bleys and Girot were combined, the claimed invention would not be taught or suggested because methacrylamidopropyl trimethyl ammonium chloride would be present in the polyurethane foam of Bleys, not trimethyl ammonium chloride.

Claims 2-7 and 9-17 are allowable, *inter alia*, as depending from allowable base claims, namely claims 1 and 8, respectively.

Dependent claims 2, 5-7, 10, and 12-17 are further allowable for the reasons described above since Girot does not cure the above-mentioned deficiencies in Bleys.

ENTRY OF AMENDMENTS

The proposed amendments to claims 8, 12, and 16 should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings and do not add new matter to the application. Further, the amendments do not raise new issues or require a further search. Finally, if the Examiner determines that the amendments do not place the application in condition for allowance, entry is respectfully requested upon filing of a Notice of Appeal herein.

CONCLUSION

Claims 1-17 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicants' undersigned attorney.

Respectfully submitted,

/Stephen R. Christian/

Stephen R. Christian
Registration No. 32,687
Attorney for Applicants
P.O. Box 1625
Idaho Falls, ID 83415-3899
Phone: (208) 526-9140
Fax: (208) 526-8339

Date: 29 June 2006